

APL2100 SERIES

High Energy Picosecond Amplifiers



APL210x series amplifiers are designed to produce up to 2200 mJ picosecond pulses. High pulse energy, excellent pulse-to-pulse energy stability, superior beam quality makes APL210x series picosecond amplifiers well suited for applications like OPCPA pumping, non-linear optics and others. Ekspla can offer a seeder meeting customer's requirements.

Regenerative amplifier / Power amplifier design

APL210x series amplifiers are designed to be seeded by external seeding source. Diode pumped regenerative amplifier ensures amplification of seed signal to stable mJ level pulse for amplification in linear amplifiers. Advanced beam shaping ensures smooth, without hot spots beam spatial profile at the laser output. Low light depolarization level allows high efficiency generation of up to 4th harmonic with optional build-in harmonic generators.

Build-in harmonic generators

Angle-tuned DKDP crystals harmonic generators mounted in temperature stabilized heaters are used for second, third and fourth harmonic generation.

Harmonic separation system is designed to ensure high spectral purity of radiation and direct it to the output ports.

Simple and convenient laser control

For customer convenience the amplifier can be controlled through remote control pad or USB interface. The control pad features a backlit display that is easy to read even while wearing laser safety eyewear. Alternatively, the amplifier can be controlled from personal computer with supplied software for Windows™ operating system. LabVIEW™ drivers are supplied as well.

Repetition rate and timing of the pulses can be locked to the external RF source (with -PLL option) or other ultrafast laser system (with -FS option).

APL2100 series available models

Model	Features
APL2101	Delivers 200 mJ, 90 ps pulses at 10 Hz repetition rate
APL2103	Delivers 300 mJ, 90 ps pulses at 10 Hz repetition rate
APL2105	Delivers 550 mJ, 90 ps pulses at 10 Hz repetition rate
APL2106	Delivers 1000 mJ, 90 ps pulses at 10 Hz repetition rate
APL2107	Delivers 2200 mJ, 90 ps pulses at 10 Hz repetition rate

FEATURES

- ▶ Diode pumped regenerative amplifier
- ▶ Seeding of regenerative amplifier with customers super-continuum seeding source
- ▶ Wide selection of seeders available
- ▶ Flashlamp pumped power amplifier
- ▶ Advanced beam shaping for high pulse energy
- ▶ Thermally induced birefringence compensated design for high pulse repetition rates
- ▶ Low jitter synchronisation pulses for streak camera triggering with 10 ps rms jitter (optional)
- ▶ Water-water heat exchanger for cooling of pump chambers
- ▶ Remote control pad
- ▶ Control through CAN or USB interface (RS232 and LAN is optional)
- ▶ Optional temperature stabilized second, third and fourth harmonic generators

APPLICATIONS

- ▶ OPCPA pumping
- ▶ OPG/OPA pumping
- ▶ Other spectroscopic and nonlinear optics applications...

SPECIFICATIONS ¹⁾

Model	APL2101	APL2103	APL2105	APL2106	APL2107
Output energy					
at 1064 nm	200 mJ	300 mJ	550 mJ	1000 mJ	2200 mJ
at 532 nm ²⁾	100 mJ	150 mJ	250 mJ	500 mJ	1100 mJ
at 355 nm ³⁾	60 mJ	90 mJ	170 mJ	300 mJ	inquire
at 266 nm ⁴⁾	20 mJ	30 mJ	60 mJ	100 mJ	inquire
Pulse energy stability (StdDev) ⁵⁾					
at 1064 nm	0.6 %				
at 532 nm	1.0 %				
at 355 nm	2.0 %				
at 266 nm	3.0 %				
Pulse duration (FWHM) ⁶⁾					
90 ± 10 ps					
Pulse repetition rate ⁷⁾					
10 Hz					
Triggering mode					
external					
Spatial mode ⁸⁾					
super-Gaussian					
Beam divergence ⁹⁾					
< 0.5 mrad					
Typical beam diameter ¹⁰⁾					
	~ 11 mm			~ 17 mm	~ 24 mm
Beam pointing stability ⁵⁾					
< ±60 µrad					
Pre-pulse contrast					
> 200 : 1					
Polarization					
linear, > 100 : 1					

INPUT	
Wavelength	1064 nm
Pulse duration range (FWHM)	20 – 90 ps
Pulse repetition rate	50 – 95 MHz
Average power	> 20 mW

PHYSICAL CHARACTERISTICS			
Laser head size (W×L×H)	600 × 1500 × 350 mm	600 × 1800 × 350 mm	TBA
Power supply size (W×L×H)	550 × 600 × 1100 mm	550 × 600 × 1230 mm	TBA

OPERATING REQUIREMENTS			
Water service	< 12 l/min, below 20 °C		< 25 l/min, below 20 °C
Relative humidity	20–80 % (non condensing)		
Operating ambient temperature	22 ± 2 °C		
Mains voltage ¹¹⁾	208 – 240 VAC, single phase, 50/60 Hz		220, 380 or 400 V AC, three phases, 50/60 Hz
Power rating ¹²⁾	< 2 kVA	< 2.5 kVA	< 4.5 kVA

¹⁾ Due to continuous improvement, all specifications are subject to change. Parameters marked typical are illustrative; they are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm and for basic system without options.

²⁾ For APL210x-SH and APL210x-SH/FH options. Outputs are not simultaneous.

³⁾ For APL210x-TH option. Outputs are not simultaneous.

⁴⁾ For APL210x-SH/FH option. Outputs are not simultaneous.

⁵⁾ Rms, measured over 30 s.

⁶⁾ Optional 30 ps duration. Inquire for pulse energies.

⁷⁾ Should be specified when ordering. Inquire for custom pulse repetition rates.

⁸⁾ Gaussian fit >80%.

⁹⁾ Full angle measured at the 1/e² level at 1064 nm.

¹⁰⁾ Beam diameter is measured at 1064 nm at the 1/e² level.

¹¹⁾ Voltage fluctuations allowed are +10% / -15% from nominal value.

¹²⁾ Required current rating can be calculated by dividing power rating by mains voltage.



OPTIONS

- ▶ **Option P30.** Provides 30±3 ps output pulse duration. Contact EKSPLA for pulse energy specifications.
- ▶ **Seeder.** Optional seeder can be provided on request.
- ▶ **Option FS.** External seeder input via motorized spectral broadening stage for APL2100 series.
- ▶ **Option PLL.** Precise trigger to external RF signal with jitter < 1 ps.
- ▶ **AW Water-air cooling option.** Water-air cooling unit or chiller for APL2100 series.
- ▶ **20 Hz option.** 20 Hz output at all wavelengths with reduced energy output
- ▶ **Multiple channel option.** Multiple outputs of same or different wavelength/energy are available.

ORDERING INFORMATION

Note: Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer than 1 hour then laser (system) needs warm up for a few hours before switching on.

APL2105-P90-10-SH/TH/FH

